

Evaluation of the Influence of the type of Irrigating Solutions in Postoperative Pain and Regression of Periradicular Injury in Teeth Obtained in Single Session and Single Cone – Clinical Case Study

Grazyelly Duarte Ramos, Kemily Rocha Fernandes, Willian Alencar Ribeiro, Eduardo Fernandes Marques

Instituto Tocantinense Presidente Antônio Carlos Fapac/Itapc Porto Nacional

Received: 12 Oct 2022,

Received in revised form: 01 Nov 2022,

Accepted: 07 Nov 2022,

Available online: 14 Nov 2022

©2022 The Author(s). Published by AI

Publication. This is an open access article
under the CC BY license

(<https://creativecommons.org/licenses/by/4.0/>).

Keywords— Postoperative pain,
Endodontics, single session.

Abstract— Endodontic treatment aims at the chemical and mechanical preparation of a dental element that has inflammation or pulp necrosis. During endodontic intervention, postoperative pain may develop, as well as difficulty in the regression of the periradicular lesion. Given the context, the present work is a clinical case report with the objective of evaluating whether the type of irrigating solution used in the endodontic treatment of filled teeth in a single session and single cone influences the postoperative symptomatology and regression of the periradicular lesion. This is a clinical, exploratory, qualitative and descriptive case study, where 2 patients were treated. They were divided into two groups: G1 (n:01) (irrigation with 2.5% sodium hypochlorite) and G2 (n:01) (irrigation with 2% chlorhexidine gel and saline). All dental elements were anesthetized, access surgeries were performed, initial exploration with K file # 10 or 15 was performed until the apparent length of the tooth. Instrumentation technique was performed with hand files and confirmation of working length through Root foraminal locator. Final irrigation was performed with 3 ml of 17% EDTA. The canals were dried with capillary tips, attached to a high-power suction device and with absorbent paper cones and filled, in the same session, by the Tagger Hybrid technique and restored with composite resin. Patients were followed for a period of 24h, 48h, 2, 3 and 6 months for postoperative pain assessment and periradicular lesion regression. Through the results obtained, it was noted that although both irrigating solutions are effective, it was observed that 2.5% sodium hypochlorite caused grade 3 pain according to the patient's pain scale during the first 24 hours, compared with 2% chlorhexidine gel, which had no painful symptoms at any time after completion of treatment and follow-up. In conclusion, in this study, 2.5% sodium hypochlorite may cause more postoperative pain compared to 2% chlorhexidine gel, but there was no significant difference in pain levels between the groups.

I. INTRODUCTION

Dental caries is considered an infectious disease that develops in the dental elements, demineralizing the surface through the acid produced by bacteria, and if left untreated at the beginning it can cause pulpal inflammation, leading to endodontic treatment; other reasons why it can cause endodontics is due to trauma, periodontal infections, among others (LEITES; PINTO; SOUSA; 2006).

Endodontic treatment aims to decontaminate and seal root canals. It is performed in stages: chemical-mechanical preparation, intracanal medication, and root canal filling; Decontamination of all conduits is essential correctly, it is one of the great allies of the dental surgeon and the irrigating solutions that are used in chemical preparation, as an aid to the mechanical preparation performed with files (SIQUEIRA JR et al., 2012).

The most used irrigating solutions are sodium hypochlorite and chlorhexidine, these solutions have antimicrobial action and the ability to dissolve organic matter, chlorhexidine has a low toxicity, and has been widely used in patients who are allergic to sodium hypochlorite, it has a great bacteriostatic and bactericidal property, and its substantivity property can last up to 12 weeks. On the other hand, hypochlorite, which is the most used irrigating solution, is a great tissue solvent, bleaching and lubricating action, but it is toxic to periapical tissues (GATELLI; BORTOLINI, 2014).

Along with an effective decontamination of the conduits, there must be a better sealing of the canal, which can be performed by a three-dimensional obturation that fills the entire space of the conduit with gutta-percha and obturator cement, to prevent the entry of microorganisms, avoiding a new reinfection, there are two obturation techniques for root canals, the single accessory cone, and the lateral condensation (OLIVEIRA et al., 2017).

To simplify several operative steps, single sessions of teeth with periapical lesions obtained great visibility in patients suitable for this procedure. Despite the clinical advantages, an endodontic treatment mainly involving periapical lesions is recommended to involve more than one session, since if not performed correctly it can lead to several harmful factors for the patient, such as infections (SOARES; CÉSAR, 2001).

Due to the pain relief after the first endodontic session, Waskiewicz et al., (2015), noted that performing the treatment using the single-visit technique proved to be effective and safe, and mainly helped to ensure that treatments were completed correctly without giving up the patient. patient in the next sessions.

The obturation of root canals using the single cone technique is quite effective in endodontic treatment. great instrumentation and irrigation solutions are of paramount importance for their antimicrobial action (GUILHERME; MANDARINI, 2018).

Bashetty and Hegde (2010) conducted a study comparing postoperative pain after endodontic treatment, using 2% chlorhexidine and 5.25% sodium hypochlorite, and it was observed that the group that used hypochlorite increased pain in the 6th day. hours and had a decrease on the seventh day, and with chlorhexidine there was a significant decrease from the 6th hour; Bourreau, Soares and Souza-Filho (2015), shows that the auxiliary chemical substance does not influence postoperative pain.

The present work is a clinical case report with the objective of evaluating whether the type of irrigating solution used in the endodontic treatment of filled teeth in a single session and single cone influences the postoperative symptomatology and regression of the periradicular lesion.

II. METHODOLOGY

The research was carried out at the national FAPAC/ITPAC Porto Nacional multidisciplinary clinic and approved by the ethics committee CAAE - 63008322.5.0000.5516.

Initially, the patient was informed about the technique of instrumentation and obturation of the root canals and after signing the informed consent, for subsequent treatment using the following protocol:

Initially, anamnesis, tactile inspection and periapical radiography of the dental element were performed, followed by anesthesia with Lidocaine 1:100000 (Dentsply/Sirona, Ballaigues - Switzerland). After that, the carious process was removed with a low-speed motor with spherical drills (Dentsply/Maillefer, Ballaigues - Switzerland) and access surgery with drills 1014 and 3082 (KG Sorensen, Barueri - SP).

Absolute isolation was performed with a rubber sheet (Madeitex, São José dos Campos - SP), Ostby isolation arch (Prisma, São Paulo - SP) and various isolation clamps (KSK, Rio de Janeiro - RJ) disinfection of the operative field with 0.2% chlorhexidine (Formula & compounding pharmacy - Palmas -TO).

Initial exploration with K file # 10 or 15 (Dentsply/Sirona, Ballaigues - Switzerland) was done to the apparent length of the tooth. Instrumentation technique to be performed with Target hand files (Easy, Belo Horizonte - Brazil), followed by preparation of the cervical third with files 15, 20, 25 and orifice shaper 08/15

(Easy, Belo Horizonte – Brazil) towards the crown – apex respecting the anatomy of the canal, always maintaining a minimum distance of 5 mm from the apical limit on the radiograph and in curved canals until the beginning of the curvature (during the entire preparation of the cervical third, patency of the root canal will be performed with a file 10). Then, odontometry was performed with a Root ZX foraminal locator (J Morita, Kyoto - Japan), obtaining the real length of the tooth. Foraminal patency was performed with K file # 10 or 15 (Dentsply/Sirona, Ballaigues - Switzerland) 1 mm beyond the actual length of the tooth, defined by an electronic foraminal locator. Patency check with file (10 or 15). Subsequently, the anatomical file and memory were obtained 1 mm short of the actual length of the tooth, thus establishing the working length.

For irrigation of the root canal system, patients were divided into two groups:

G1 (n= 1) – During instrumentation, irrigation was performed with 2.5% sodium hypochlorite (Manipulation Pharmacy – Fórmula e Ação – São Paulo – SP), Luer Slip 10 ml plastic syringe (Advantive, Nanchang Jangxi - China) and disposable needle 25x0.55 (BD, Curitiba – PR). During the entire instrumentation process, the needle was inserted until 2 mm short of the working length was reached.

G2 (n=1) – During instrumentation, irrigation was performed with 2% chlorhexidine gel and saline solution (Manipulation Pharmacy – Fórmula e Ação – São Paulo – SP), Luer Slip 10 ml plastic syringe (Advantive, Nanchang Jangxi - China) and a 25x0.55 gauge disposable needle (BD, Curitiba – PR). The needle was introduced throughout the instrumentation process until reaching 2 mm short of the working length.

After the root canals were prepared, they were dried with capillary tips (Ultradent Products, Inc, South Jordan, Utah, USA) attached to a high-power sucker and with absorbent paper cones (Tanari, Manacapuru - AM).

Finally, irrigation was performed with 3 ml of 17% EDTA (Manipulation Pharmacy – Fórmula e Ação – São Paulo – SP). First, 1 ml of 17% EDTA was inserted and then, ultrasonic vibration was performed with a 25 IRRI S insert (VDW; Endo Ultrasonic Files, Endodontic Synergy, Munich, Germany) at a frequency of 30 kHz. Soon after, irrigation was performed with 5 ml of sodium hypochlorite (Farmácia Fórmula & Ação, São

Paulo – SP). The canals were dried with capillary tips (Ultradent Products, Inc, South Jordan, Utah, USA) properly attached to a high-power sucker and with absorbent paper cones (Tanari, Manacapuru - AM).

Using AH Plus sealer (Dentsply/Sirona, Munich, Germany) and mixed according to the manufacturer's recommendations. The canals were filled, in the same session, by the Tagger Hybrid technique and restored with composite resin.

Patients were followed for a period of 24h, 48h, 2, 3 and 6 months for postoperative pain assessment.

III. RESULTS

The results of this research were obtained through the study of clinical cases, using two patients, which took place through the observation of painful symptoms through a pain scale. Each patient was treated using an irrigating solution, with patient G1 endodontics was performed with 2.5% sodium hypochlorite, with patient G2 endodontics with 2% chlorhexidine gel and saline solution were performed.

The patient A.V.S. female, sought dental care at the Dental Clinic of ITPAC Porto Nacional, complaining of spontaneous pain, in which she used analgesic for pain relief, after the clinical examination it was observed that the dental element 34 had the positive sensitivity test, positive percussion test showing symptomatic irreversible pulpitis (Figure 1). After completing the endodontic treatment with the use of 2.5% sodium hypochlorite as an irrigating solution (figure 1), the patient was asked if she had experienced painful symptoms after 24h, 48h, 2, 3 and 6 months; which she reported the presence of pain only in the first 24 hours after endodontic treatment (Figure 3).

The patient M.D.C.S, male, sought dental care at the Dental Clinic of ITPAC Porto Nacional, complaining about the need to do endodontic treatment, after the clinical examination it was observed that the dental element 25 was already accessed, the sensitivity test gave negative, thus showing necrosis (Figure 2). After the endodontic treatment, with 2% chlorhexidine gel irrigating solution and saline solution (figure 2), the patient was asked if he had experienced painful symptoms after 24h, 48h, 2, 3 and 6 months; which he reported absence of pain and discomfort after performing and continuing endodontic treatment (figure 4).

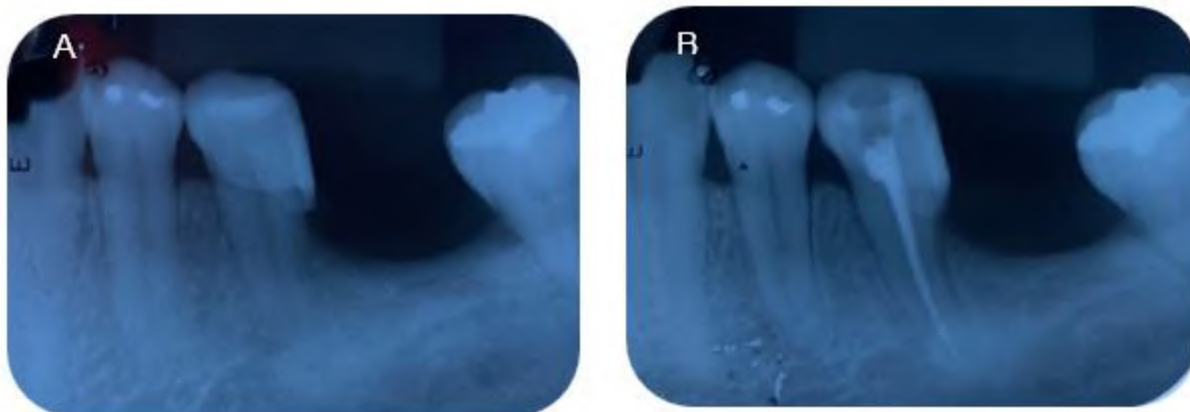


Fig. 1 – Periapical radiograph of the lower premolar region. A) Radiograph of element 34 to be rehabilitated. B) Final radiograph of element 34, with endodontic treatment performed.

Source: Own Author

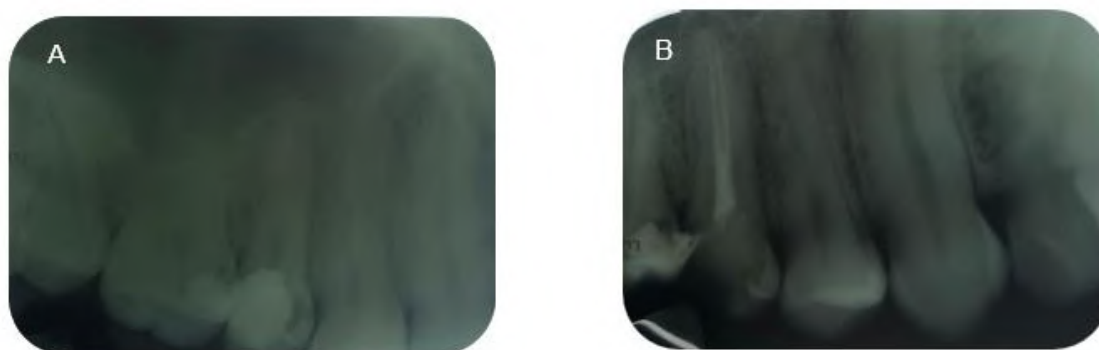


Fig.2 – Periapical radiograph of the upper premolar region. A) Radiograph of element 25 to be rehabilitated. B) Final radiograph of element 25, with endodontic treatment performed.

Source: Own Author

ITPAC | **Afva** ASSOCIAÇÃO FORTO NACIONAL

Ficha da escala de intensidade da dor pós-operatório

Elemento dentário: 34

Dente necrosado: Sim () Não (x) Dente vital: Sim (x) Não ()

Período: 24h (3) 48h (0) 2 meses (0) 3 meses (0) 6 meses (0)

Solução irrigadora utilizada: Ringer-Locke de 2ml

Escala de dor
ferramenta de avaliação da dor

0	1	2	3	4	5	6	7	8	9	10
SEM DOR	DUVIDA	DESCONFORTO-TÁVEL	TOLERÁVEL	DOLOREDO	MUITO DOLOREDO	INTENSO	MUITO INTENSO	TERRÍVEL	INSUPORTÁVEL	EXTREMA
NORMAL		DOR LEVE		DOR MODERADA		DOR SEVERA				

Fonte: Elaborado pelos autores.

Fig.3 - Patient pain scale G°1

Source: Own Author

ITPAC | **Afva** ASSOCIAÇÃO FORTO NACIONAL

Ficha da escala de intensidade da dor pós-operatório

Elemento dentário: 25

Dente necrosado: Sim (x) Não () Dente vital: Sim () Não (x)

Período: 24h (0) 48h (0) 2 meses (0) 3 meses (0) 6 meses (0)

Solução irrigadora utilizada: Cloroxidina gel 2%

Escala de dor
ferramenta de avaliação da dor

0	1	2	3	4	5	6	7	8	9	10
SEM DOR	DUVIDA	DESCONFORTO-TÁVEL	TOLERÁVEL	DOLOREDO	MUITO DOLOREDO	INTENSO	MUITO INTENSO	TERRÍVEL	INSUPORTÁVEL	EXTREMA
NORMAL		DOR LEVE		DOR MODERADA		DOR SEVERA				

Fonte: Elaborado pelos autores.

Fig.4 - Patient pain scale G°2

Source: Own Author

IV. DISCUSSION

Irrigating solutions have an excellent function of eliminating microorganisms. Solda (2021) carried out a literature review comparing the effectiveness of chlorhexidine and sodium hypochlorite, which are irrigants widely used in root canal decontamination protocols and observed that even NaOCL is the most chosen among dental surgeons, both irrigators have its positive and negative sides, showing that hypochlorite has a high tissue dissolution power while chlorhexidine has a low toxicity, both being good for clinical use.

Pretel et al. (2011), carried out a literature review with the objective of evaluating the use of irrigating substances for endodontic treatments in root canals, using different irrigating solutions and dissimilar concentrations. its antimicrobial action and the fact that it acts as a tissue solvent, however chlorhexidine is known for its low toxicity, contains antimicrobial action, has good effectiveness in treated canals and therefore is a good alternative for endodontic treatments.

Sarmiento et al. (2019), developed a project comparing the effect of sodium hypochlorite and chlorhexidine on postoperative pain in canals treated with necrotic pulps, through a review where they sought 775 citations, where only 5 were chosen for the systemic review, they saw that there was no difference in symptomatology between the irrigating solutions used, however it obtained a divergent result in the same study where the patient had pain in the sixth postoperative hour where NaOCL was used, but in conclusion there was no change in the result.

Bourreau, Soares and Souza-Filho (2015), emphasizes in a clinical study where he analyzed the influence of 2% chlorhexidine and 5.25% sodium hypochlorite on postoperative pain, 301 endodontic treatments were performed in session. single, with enlargement of the apical foramen and on cement extension to the periapex. Chlorhexidine gel at 2% and sodium hypochlorite at 5.25% were used, and discomfort was assessed for 24 hours. There were no significant differences, showing that the auxiliary chemical substance does not influence postoperative pain symptoms; however, with the results obtained in this study, it is observed that sodium hypochlorite can cause pain in the first 24 hours, however, in this clinical case, enlargement of the apical foramen was not performed.

In forty patients with irreversible pulpitis, pulp necrosis and non-vital teeth, a cleaning and shaping of the canals using 2% chlorhexidine solution in group I and 5.25% sodium hypochlorite solution in group II was performed, which was recorded by the patients on the

scale. visual analogue a degree of pain at 1-week intervals. Group I was in the range of 0.65 and 3.35 and in group II it was between 0.95 and 4.50, and it was observed that the level of pain between the different solutions changed in the 6th hour after treatment, where saw that chlorhexidine always maintained a decrease on the pain scale, while sodium hypochlorite had an increase in the 6th hour and a decreasing level in the other 24 hours, 4th and 7th days, so there was no significant difference in pain levels between the groups (BASHETTY; HEGDE, 2010).

V. CONCLUSION

Through the results obtained, it was noted that although both irrigating solutions are effective, it was observed that 2.5% sodium hypochlorite caused pain to the patient during the first 24 hours, compared with 2% chlorhexidine gel, which did not there were painful symptoms at any time after completion of treatment and follow-up.

REFERENCES

- [1] BASHETTY, Kusum et al. **Comparação de soluções irrigantes de clorexidina 2% e hipoclorito de sódio 5,25% na dor pós-operatória: ensaio clínico randomizado**. Indian Journal of Dental Research, v. 21, n. 4, pág. 523, 2010. Disponível em: <https://pubmed.ncbi.nlm.nih.gov/21187618/>
- [2] BOURREAU, Marcelle Louise Sposito; SOARES, Adriana de Jesus; SOUZA-FILHO, Francisco José de. **Evaluation of postoperative pain after endodontic treatment with foraminal enlargement and obturation using two auxiliary chemical protocols**. Revista de Odontologia da UNESP, v. 44, p. 157-162, 2015. Disponível em: <https://www.scielo.br/j/rounesp/a/HH6Q9hdjhtVthCV3gGJmhd/>
- [3] GATELLI, Gecyca; BORTOLINI, Maria Cecilia Tezelli. **O uso da clorexidina como solução irrigadora em endodontia**. Revista uninga review, v. 20, n. 1, 2014. Disponível em: <file:///C:/Users/Cliente/Desktop/TCC/1555-13-4465-1-10-20180115.pdf>
- [4] GUILHERME, Nadya Mahfouz; MANDARINI, Danilo Rodrigues. **Técnicas de obturação: condensação lateral vs cone único**. Archives Of Health Investigation, v. 7, 2018. Disponível em: <file:///C:/Users/Cliente/Desktop/TCC/3787-Texto%20do%20artigo-13190-1-10-20181101.pdf>
- [5] LEITES, A. C. B. R.; PINTO, Marcia Bueno; SOUSA, Ezilmaria Rolim de. **Aspectos microbiológicos da cárie dental**. Salusvita, v. 25, n. 2, p. 239-52, 2006. Disponível em: https://secure.unisagrado.edu.br/static/biblioteca/salusvita/salusvita_v25_n2_2006_art_09.pdf
- [6] OLIVEIRA, Jeanine de Lima Costa. **TÉCNICAS DE OBTURAÇÃO: CONDENSÇÃO LATERAL VS CONE ÚNICO**. 2017. Disponível em: <http://faculadefacsete.edu.br/monografia/files/original/447efefb4c39c62b8930cb58b48fee24.pdf>

- [7] SIQUEIRA JR, José Freitas et al. **Princípios biológicos do tratamento endodôntico de dentes com polpa necrosada e lesão perirradicular.** Revista Brasileira de Odontologia, v. 69, n. 1, p. 08, 2012. Disponível em: revista.aborj.org.br/index.php/rbo/article/view/364
- [8] SOARES, Janir Alves; CÉSAR, Carlos Augusto Santos. **Avaliação clínica e radiográfica do tratamento endodôntico em sessão única de dentes com lesões periapicais crônicas.** Pesquisa odontológica brasileira, v. 15, p. 138-144, 2001. Disponível em: <https://www.revistas.usp.br/pob/article/view/42933/46558>
- [9] WASKIEVICZ, Ademar Luiz et al. **Avaliação da dor pós-operatória em dentes tratados endodonticamente.** Journal of Oral Investigations, v. 2, n. 1, p. 43-48, 2015. Disponível em: <https://www.imed.edu.br/Uploads/CEOMEvent/Ademar%20Luiz%20Waskievicz.pdf>